Has the Public's Knowledge of Anatomy Been Hamstrung?

A Questionnaire-Based Exploration of Basic Anatomical Awareness Within the General Population.

Todd FS[1], Whiting JR[1], Taylor A[2], Smith CF[1]

[1]Department of Medical Education, Brighton and Sussex Medical School (BSMS), Brighton, United Kingdom

[2]Clinical Anatomy Learning Centre, Lancaster Medical School, Lancaster, United Kingdom

Introduction

Despite a recent resurgence in public interest for anatomical sciences,[1] little research exists to determine the extent of their knowledge. We aimed to assess this through a questionnaire-based localisation of anatomical structures.

Our findings suggest a significant gender discrepancy, as well as the presence of prevalent anatomical misconceptions which, to our best knowledge, have not been documented in the literature. These results have implications for the content and targeting of future public and clinical teaching.

Methodology

Recruitment: Questionnaires were distributed to attendees of a public talk delivered by BSMS Anatomy faculty as part of the September 2017 British Science Festival.

Questionnaire: Developed at Lancaster Medical School, and asked participants to identify the location of 22 anatomical structures on a blank human outline (Figure 1).

Demographics: 45 questionnaires were returned, of which 37 had complete demographic information. The age range was 18 to 86. Of the 45 questionnaires returned, 37 had complete demographic information (24 females and 13 males). Questionnaires with incomplete information were omitted from gender analysis, but included in the misconception analysis.

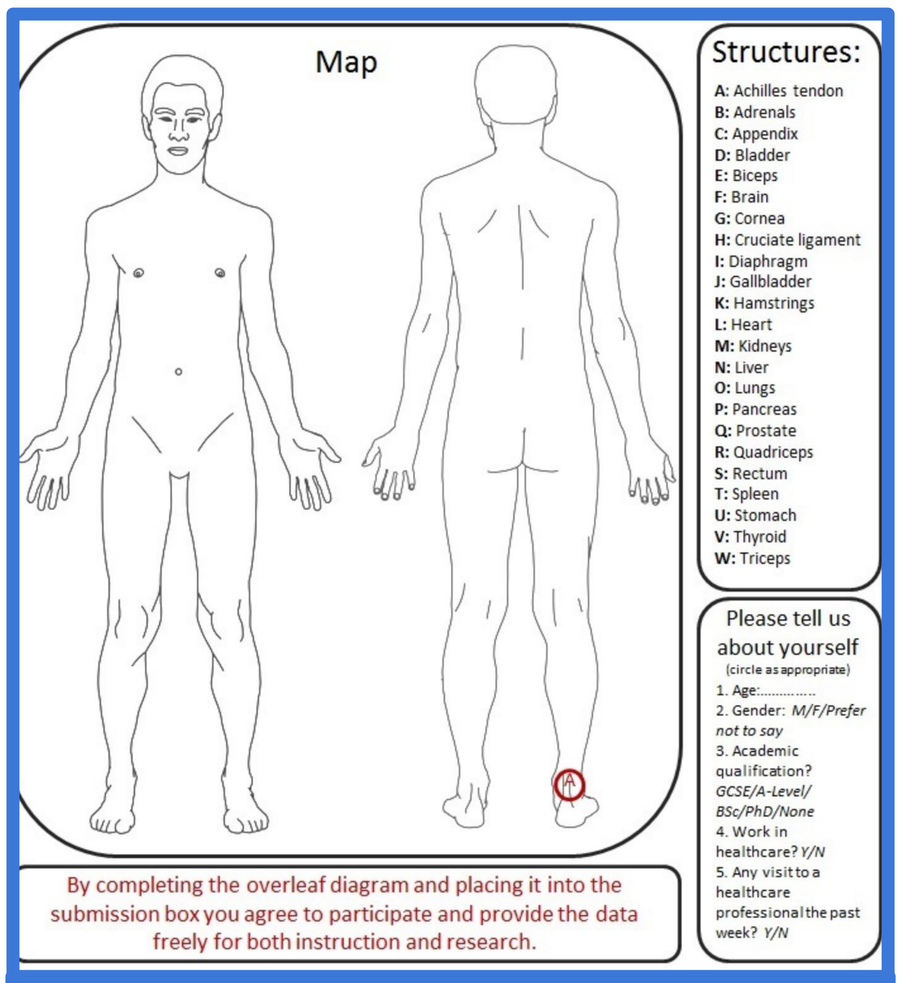
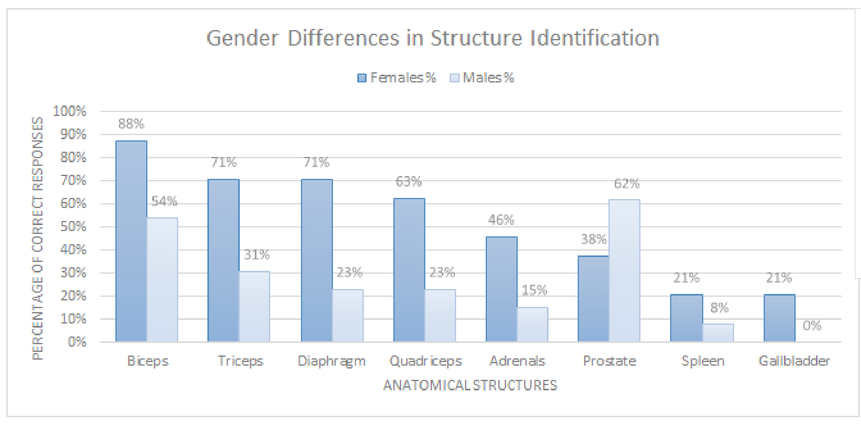


Figure 1: Questionnaire designed by Lancaster Medical School asked participants to identify 22 anatomical structures on a blank human outline.

Results

Gender Differences

Females consistently outperformed males in 18/22 anatomical structures tested. Only the prostate, rectum, cornea and kidneys were answered better by males. Large gender differences in scores were seen for several of the structures, as highlighted in figure 2. Notably, only the prostate exhibited a large gender discrepancy in favour of males. Interestingly, no males were able to correctly identify the location of the gallbladder. Figure 3 compares the remaining structures. The mean female score was 14.0, whereas the mean male score was 11.7.



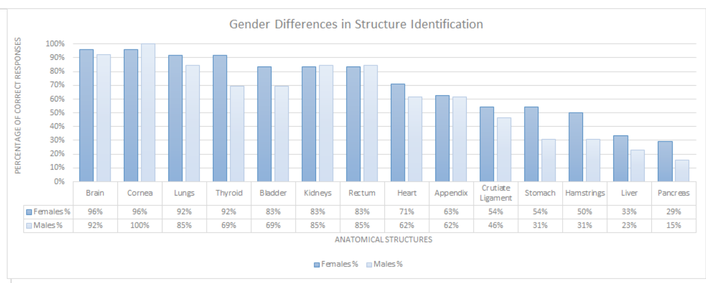


Figure 2 (left) and Figure 3 (above): Comparative percentage of responses that correctly localised the corresponding anatomical structure. Figure 2 highlights select structures with large gender differences in results. Figure 3 is included for completeness.

Anatomical Misconceptions

Two consistent mistakes were highlighted amongst participants during analysis. These were:

1) *The "calves" were mistakenly labelled as the "hamstrings".*
2) *The adrenal glands were incorrectly identified as being located in the head or neck.*

The first misconception was seen on 31.1% of respondent's questionnaires (14/45), whilst the second was seen in 20% (9/45). This includes two participants who had both misconceptions on their answer sheet. In total, 46.7% of participants (21/45) had at least one of the above anatomical misconceptions.

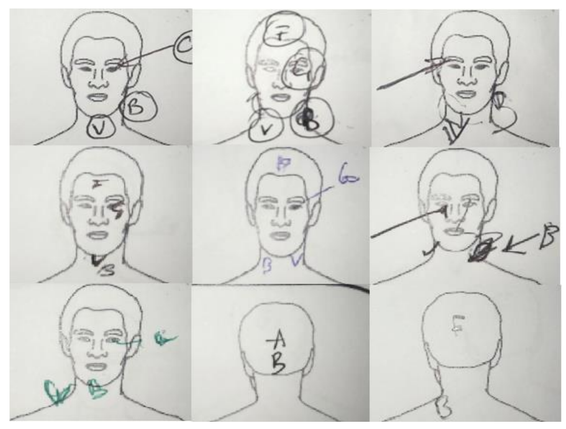


Figure 4: Examples of incorrect labelling of the adrenal glands. Note that in the majority of answers, the gland is labelled as being in the anterior neck, but the thyroid is correctly labelled.

Discussion and Conclusions

Literature

The mean scores for both males and females closely reflect that of prior studies by Kljakovic et al.[2] (Females: 52.0%, Males: 50.0%, n=1156) and Weinman et al.[3] (Females: 50.9%, Males: 45.4%, n= 722), however neither differences reached significance. Whilst the larger gender difference seen in our results may be attributed to a small sample size or baseline knowledge biases introduced by sampling attendees of a public anatomy talk, Weinman et al.[3] corroborates our findings in that females outperformed males in 10/11 structures tested. The detailing of public anatomical misconceptions has, to the best of our knowledge, not been documented in the literature.

Implications

Miscommunication is a major source of poor outcomes in general practice[5] and a significant discrepancy exists between doctor and patient interpretations of medical terms, including anatomical language.[6] This study highlights the need for doctors to be aware that misconceptions are prevalent and answers such as "glands in the neck" or "hamstrings" should be clarified in the history. An awareness of the public's lack of ability to localise organs, particularly in males, may further improve patient satisfaction and outcomes by preventing communication errors and empowering patients through knowledge.

Conclusion

Although this study does possess limitations, it gives us a valuable insight into gender discrepancies and common misconceptions. Further research is needed to investigate these, but if these results hold true then changes should be made to the way in which anatomy is taught to the general public.

References

1. Gillingwater TH, Findlater GS. Anatomy: back in the public spotlight. The Lancet. 2015 May 9;385(9980):1825.
2. Kljakovic M, Risk J.The anatomical placement of body organs by Australian and New Zealand patients and health professionals in general practice. J Prim Health Care. 2012 Sep 1;4(3):239-41.
3. Weinman J, Yusuf G, Berks R, Rayner S, Petrie KJ. How accurate is patients' anatomical knowledge: a cross-sectional, questionnaire study of six patient groups and a general public sample. BMC Family Practice. 2009;10:43.
4. Rashid A and Jagger C. Patients' knowledge of anatomical location of major organs within the human body: a comparison between Asians and non-Asians. Fam Pract. 1996 Oct;13(5):450-4.
5. Morgan S. Miscommunication between patients and general practitioners: implications for clinical practice. J Prim Health Care. 2013 Jun 1;5(2):123-8.
6. Boyle. Difference between patients' and doctors' interpretation of some common medical terms. Br Med J. 1970 May; 2(5704):286-9.